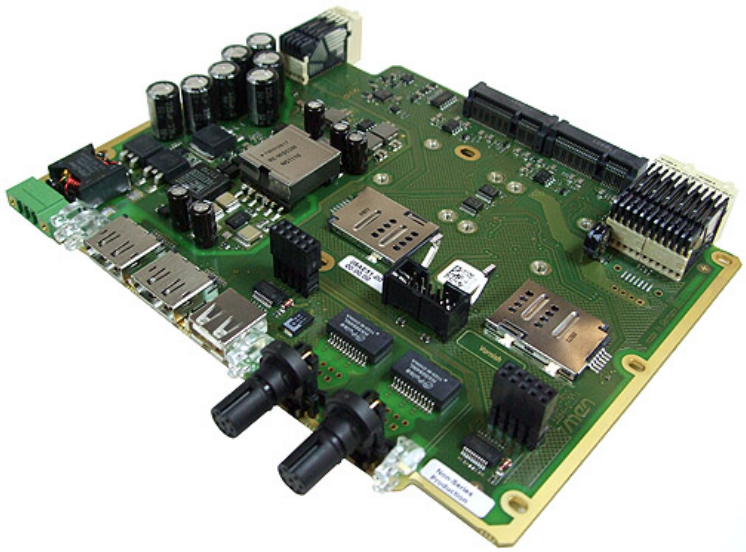
# AE51 – Graphics and I/O Interface for Display Computers

- **2 DisplayPort® interfaces**
- **2 Gb Ethernet on M12 connectors**
- **1 USB 2.0**
- **2 PCI Express® Mini Card slots for WLAN, UMTS, GPS, GSM, HSDPA, EDGE, LTE**
- **2 SA-Adapter slots for 2 UARTs (alternative: 1 IBIS or GPS and 1 CAN bus)**
- **HD audio**
- **24 VDC nom. (9 to 36 V) class S2 power supply**
- **-40 to +85°C operating temperature (screened)**
- **EN 50155 compliant (railways)**
- **Prepared for ISO 7637-2 compliance (E-mark for automotive)**



The AE51 is a combined graphics and I/O interface board for MEN's display computer electronics like the SC24 SBC and possible subsequent models.

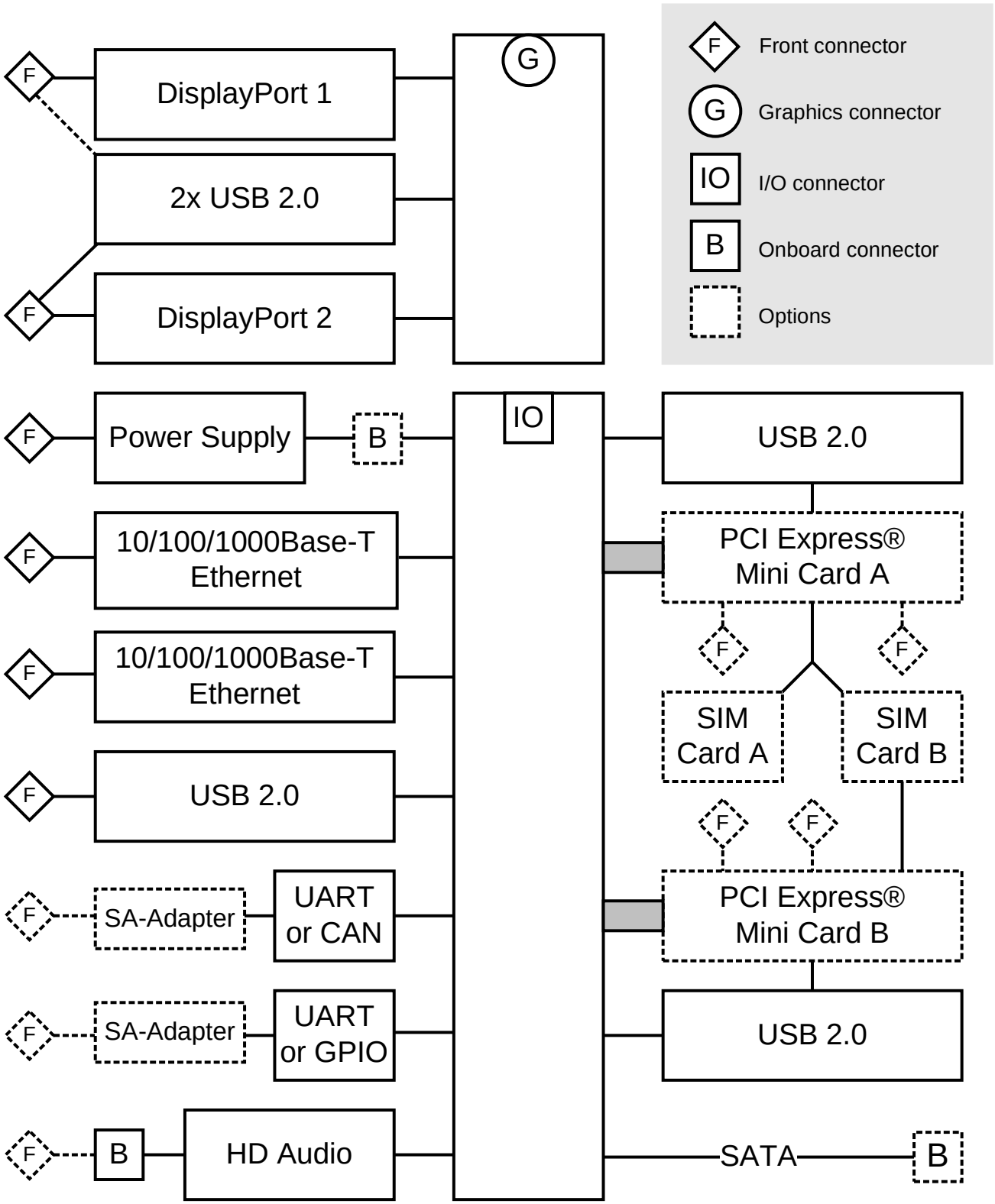
Three rugged AirMax VS® connectors transport the various I/O signals from the SBC board to the AE51, where they are made available on standard connectors like USB, 9-pin D-Sub (serial I/O and HD audio, both optional), 8-pin M12 (Gigabit Ethernet), DisplayPort® and SATA. Touch functionality can be realized via the USB port. Note that the AE51 is just one suggested interface board variant for SBCs like the SC24 and as such it does not necessarily cover all possible interfaces of the connected SBC board. For example, only two independent DisplayPort® interfaces (B and C, with their individual AUX and USB channel respectively) are made available on standard DP connectors, whereas an SC24 offers two additional DisplayPort® interfaces (identical to the former two regarding image content).

The AE51 serves as a 2x PCI Express® Mini card carrier for the connected SBC board. Two SIM card slots are available. By default, one is used for each of the two PCI Express® Mini cards, but the first PCI Express® Mini card can also switch between the two SIM cards as an option. The necessary antenna connectors can be led to a front panel.

As an option, a SATA interface from the SBC board is also made available along with a 4-pin power connector for the drive, however the AE51 is not designed as a SATA HDD/SSD carrier board - the drive must be mounted independently.

The board also serves as a 30W 24 VDC nom. (9 to 36 V) class S2 wide-range power supply for the connected SBC board. If the connected display panels require more power, an external PSU can be connected via an optional power bypass connector on the AE51 to supply the necessary 12 VDC voltage for the system.

## Diagram


F
Front connector
G
Graphics connector
IO
I/O connector
B
Onboard connector
Options
DisplayPort 1
2x USB 2.0
DisplayPort 2
Power Supply
10/100/1000Base-T Ethernet
10/100/1000Base-T Ethernet
USB 2.0
SA-Adapter
UART or CAN
SA-Adapter
UART or GPIO
HD Audio
USB 2.0
PCI Express® Mini Card A
SIM Card A
SIM Card B
PCI Express® Mini Card B
USB 2.0
SATA

# Technical Data

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|---|---|
| **Board-to-board connection** | ■ 3 AirMax VS® connectors<br>□ To SBC board's graphics and I/O connectors P1/P2/P4 |
| **Front I/O** | ■ 2 DisplayPort® interfaces<br>□ AUX channels and hot plug detection<br>□ USB channels optional<br>■ HD audio<br>□ HD audio codec (Realtek ALC268)<br>□ Audio stereo in<br>□ Audio stereo out<br>□ SPDIF out<br>□ Via 10-pin onboard connector<br>■ 2 Gigabit Ethernet<br>□ Via M12 connectors<br>■ 1 USB 2.0<br>□ Via Type A connector<br>■ 2 SA-Adapter slots for serial I/O<br>□ 1 UART or IBIS, GPS<br>□ 1 UART or CAN bus<br>■ 8 status LEDs<br>□ 4 for Ethernet link and activity status<br>□ 2 for general board status<br>□ 2 for power supply status |
| **2 PCI Express® Mini Card slots** | ■ For functions like Wi-Fi, WIMAX, GSM/GPRS, UMTS<br>■ 2 SIM card slots<br>■ PCI Express® and USB interface |
| **Accelerometer / Magnetometer** | ■ 3 acceleration channels<br>□ 2 independent programmable interrupt generators for free-fall and motion detection<br>■ 3 magnetic field channels<br>□ ±1.3 to ±8,1 gauss magnetic field full-scale |
| **Miscellaneous** | ■ Gold Cap to buffer real-time clock on connected SBC board |
| **Electrical Specifications** | ■ Isolation voltage:<br>□ Ethernet ports: 1,500 VDC<br>□ DC/DC: 1,500 VDC<br>■ Supply voltage:<br>□ 24 VDC nom. (9 to 36 V)<br>□ EN 50155 power interruption class S2<br>■ Power output: 12 VDC nom.<br>■ Power consumption: Up to 30 W |
| **Mechanical Specifications** | ■ Dimensions: approx. 170 mm x 132 mm x 30 mm<br>■ Weight: approx. 100 g |
| **Environmental Specifications** | ■ Temperature range (operation):<br>□ 0..+60°C up to -40..+85°C (screened)<br>□ Fanless operation<br>■ Temperature range (storage): -40..+85°C<br>■ Relative humidity (operation): max. 95% non-condensing<br>■ Relative humidity (storage): max. 95% non-condensing<br>■ Altitude: -300 m to +3,000 m<br>■ Shock: 50 m/s², 30 ms<br>■ Vibration (function): 1 m/s², 5 Hz - 150 Hz<br>■ Vibration (lifetime): 7.9 m/s², 5 Hz - 150 Hz<br>■ Conformal coating on request |
| **MTBF** | ■ tbd. @ 40°C according to IEC/TR 62380 (RDF 2000) |

# Technical Data

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|---|---|
| **EMC** | ■ Conforming to EN 55022 (radio disturbance), IEC 61000-4-2 (ESD) and IEC 61000-4-4 (burst)<br>■ Prepared for certification according to ISO 7637-2 (E-mark) requirements |

# Configuration & Options

### Standard Configurations

| Article No. | Input Voltage | HD Audio Adapter to Front Connector | Antenna Connectors |
|---|---|---|---|
| 08AE51-00 | 24 VDC nom. | No | No |

### Options

| | |
|---|---|
| **I/O** | ■ DisplayPorts with USB channel instead of AUX channel<br>■ HD audio<br>□ Ribbon cable adapter to 9-pin D-Sub front I/O connector<br>■ Antenna connectors<br>□ For functions like Wi-Fi, WIMAX, GSM/GPRS, UMTS in combination with PCI Express® Mini Card(s)<br>□ Reverse SMA connector |
| **Mass Storage** | ■ Serial ATA (SATA)<br>□ One port for external hard-disk/solid-state drive |
| **Miscellaneous** | ■ 3-axis accelerometer and 3-axis magnetometer |
| **Electrical Specifications** | ■ Input voltage 36 VDC nom. via front connector (alternate internal PSU)<br>■ Input voltage 12 VDC via optional onboard power bypass connector |

**As the product concept is very flexible, there are many other configuration possibilities. Please contact our sales team if you do not find your required function in the options. Please note that some of these options may only be available for large volumes.**

# Ordering Information

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|---|---|---|
| **Standard AE51 Models** | **08AE51-00** | Graphics & I/O interface board for display and box computers; 2x DisplayPort®, 2x Gb Ethernet, 1x USB, 2x PCI Express® Mini card slot, 2x SIM card slot, 2x SA-Adapter slot, PSU 24 VDC, -40 to +85°C screened |
| **Related Hardware** | **08AE63-00** | DisplayPort® to LVDS converter, temperature sensor, ambient light, touch input, key control, input voltage 12V..24V, -40°..+85°C screened |
| | **08SC24-00** | Multi-display SBC with AMD T48N, 1.4 GHz, 2 GB RAM, SD card slot, mSATA slot, 2x2 DisplayPorts, 12V PSU (non isolated), prepared for -40 to +85°C screened via conductive cooling |
| | **15PX04-00** | Audio interface for mobile wireless cards, with SIM card holder, -40..+85°C screened |
| **PCI Express® Mini Cards** | **15PX01-00** | GLONASS & GPS PCI Express® MiniCard (full size), 3-axis Gyro sensor, -40..+85°C with qualified components |
| **SA-Adapters** | You can find a more detailed overview of possible carrier board/SA-Adapter combinations along with software support in our option matrix (PDF). | |
| | **08SA01-06** | RS232, not optically isolated, -40..+85°C screened |
| | **08SA02-07** | RS422/485, full duplex, optically isolated, -40..+85°C screened |
| | **08SA03-01** | 1 RS232, optically isolated, -40..+85°C screened |
| | **08SA08-01** | CAN ISO high-speed, optically isolated, -40..+85°C screened |
| | **08SA22-00** | IBIS master SA-Adapter, -40..+85°C screened |
| | **08SA22-01** | IBIS slave SA-Adapter, -40..+85°C screened |
| | **08SA25-00** | GPS receiver, isolated, -40..+85°C screened |
| | **08SA26-00** | RS422 with 15-pin D-Sub connector, with handshake signals (RTS, CTS, DCD, DTR), coated, -40..+85°C screened |
| **Miscellaneous Accessories** | **0780-0005** | DisplayPort® to DVI-D adapter, 20 cm |
| **Documentation** | Compare Chart Standard and Custom Panel PCs » Download | |
| | **20AE51-00** | AE51 User Manual |

# Contact Information

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